FAMINE PREVENTION AND FREEDOM FROM HUNGER

USAID
The US Agency for international Development

TITLE XII REPORT TO CONGRESS

Fiscal Year 1999

The majority of people in the poorest countries derive their livelihoods from agriculture; therefore, improving agriculture is necessary for economic growth. And economic growth in developing countries will lead to reduced poverty, increased food security and higher standards of living, including better health and education. By sharing our knowledge and experience with people who need it the most, we help these countries and help them grow economically. This in turn opens new markets for American companies. (Remarks of J. Brady Anderson, USAID Administrator, to the National 4-H Dairy Conference, Madison, Wisconsin, October 4, 2000)

I am pleased to present this FY 1999 report titled "Famine Prevention and Freedom from Hunger," that describes USAID implementation of the Title XII legislation.

The United States continues to be the world leader in agricultural research, training, development, and food production. Title XII has enabled us to apply the strengths and capabilities of the U. S. university community, working with other national and international groups, to combat the challenge of global hunger.

Agriculture provides employment and food. An increasingly productive and efficient agricultural sector is necessary for developing countries to secure and maintain stability and improve livelihoods. Developing the agriculture sector provides the engine of growth needed to break the yoke of poverty which is so prevalent in the poor countries of Africa and South Asia.

Through the Collaborative Research Support Programs (CRSPs), U.S. universities, in partnership with International Agricultural Research Centers (IARCS) and non-governmental organizations (NGOs) are working with citizens, organizations, and the private sector in developing countries to increase production, improve nutrition, and reduce poverty. Much progress is shown in this report, but the report makes clear the challenge is still present and requires our diligence and long term commitment. Through the application of scientific research and new approaches such as biotechnology to the food and agricultural problems of developing countries, I am confident that the challenge will be met.

J. Brady Anderson
Administrator

Today, there are 840 million undernourished people in the developing world—more people than the combined populations of the United States, Canada, Russia, France, Germany, Great Britain and Japan.

Over the next 25-30 years, the world's population is expected to increase by two billion. To meet the increased food demands of this new population, farmers worldwide will need to increase food production by at least fifty percent.

Unfortunately, our global natural resource base is already under significant pressure. Fresh water and good quality farmland, both of which are critical for agricultural production, are already in short supply. In 20 years, almost a third of the world's population will be facing an absolute shortage of water for drinking as well as for agriculture. So the challenge facing all of us today is—how can we better feed the world's people? Part of the answer lies in another question—how can we use science to help us develop crops that are more productive per acre, help us get more "crop per drop" of irrigation water? That is where the potential of biotechnology holds such promise….

We can, for instance, use biotechnology to develop new crop varieties that tolerate drought, are resistant to insects and disease, and able to capture nitrogen—an essential fertilizer—from the air. Biotechnology can also make food more nutritious by increasing the amount of Vitamin A, iron and other nutrients in the edible portion of the plant.

Remarks of J. Brady Anderson, USAID Administrator to the Congressional Black Caucus event -- Biotechnology: Reducing World Hunger, Washington, D.C., September 15, 2000.

Report to Congress on Title XII: Famine Prevention and Freedom from Hunger
Fiscal Year (FY) 1999

Executive Summary

This report summarizes implementation of Title XII legislation by the U.S. Agency for International Development (USAID) for FY 1999. USAID's collaboration with U.S. land-grant institutions and partner organizations in the public and private sectors continues to strengthen its capacity to develop solutions to food and nutrition problems and to reduce poverty in developing countries.

USAID programs are shaped by U.S. government priorities laid out in the *U.S. Action Plan on Food Security*. The Agency's Global Bureau plays a pivotal role in four of the Action Plan's policy objectives: research and education, food security and poverty reduction, biotechnology and genetic resources policies, and sustainable agriculture & environmental policy. During FY 1999, most of the Bureau's resources supported agricultural research and education. This support is channeled largely through the Consultative Group on International Agricultural Research (CGIAR) International Agricultural Research Centers (IARCs) and the nine Collaborative Research Support Programs (CRSPs) that mobilize the resources of more than 50 U.S. universities and counterparts in developing countries. And, through the Agricultural Biotechnology for Sustainable Productivity Project (ABSP), collaborative research provides the technical underpinnings for biotechnology and genetic resource policies, the third policy objective.

Additionally, USAID's Africa Bureau continues to emphasize the key areas of increased incomes and improved child nutrition, focusing on small-scale farmers and the policies and businesses that best serve them. In Latin America and the Caribbean, a key goal is to reduce poverty by focusing on sustainable use of resources. USAID programs in Asia and the Near East are concerned with improving food security and alleviating malnutrition, while Agency agricultural sector assistance in Europe and Eurasia is heavily focused on land reform and agribusiness development.

Title II Food for Peace non-emergency programs made up over 23 percent of U.S. foreign assistance in FY 1999. This funding is becoming a major source of financing for agricultural and food security activities. Priority is given to activities that improve household nutrition and agricultural productivity.

The Board for International Food and Agricultural Development (BIFAD) made several important recommendations during FY 1999. The recommendations include establishing the Strategic Partnership for Agricultural Research and Development, a subcommittee of BIFAD that would specifically review and issue recommendations for research activities and priorities; convening a high-level conference on the development of agriculture in Africa; promoting sound uses of biotechnology; and engaging of private U.S. agribusinesses, international research centers, and the university community in development efforts.

Future USAID programs will continue to be guided by the priorities addressed in the *U.S. Action Plan on Food Security* and by BIFAD recommendations. Areas of emphasis include an expanded recognition of agriculture's importance in fighting poverty, increasing trade and restoring the environment; a greater international focus by U.S. universities on agriculture, technical research, and extension in partnership with U.S. Department of Agriculture (USDA), the International Agricultural Research Centers (IARCs), non-governmental organizations, and private voluntary organizations; greater support by agriculture to environment and safety concerns and opportunities; and an increase in the contribution of agriculture to globalization and trade-based prosperity in the U.S. and overseas.

REPORT TO CONGRESS ON TITLE XII: FAMINE PREVENTION AND FREEDOM FROM HUNGER

December 2000

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REPORT TO CONGRESS ON TITLE XII:
FAMINE PREVENTION AND FREEDOM FROM HUNGER

INTRODUCTION

Title XII ("Famine Prevention and Freedom from Hunger") of the Foreign Assistance legislation was initially enacted in 1975, a time of widespread global food insecurity. Its purpose was and remains to strengthen the capacities of U.S. land-grant and other eligible universities in agricultural institutional development and research, to improve their participation in the U.S. Government's (USG) efforts to increase world food production, and to provide increased and longer-term support to the application of science to solving food and nutrition problems of developing countries.

The legislation was enacted in recognition of both the magnitude of the task of reducing famine, hunger and food insecurity globally, and the potential of the U.S. university community to contribute significantly to this effort. This rationale remains strong, with over 800 million people worldwide still suffering from inadequate food supplies and associated malnutrition. Poverty is pervasive and disproportionately found in rural areas. Post Cold War conflict consistently has poverty as a root cause, and is predominantly occurring in the poorest countries, where hunger and resource degradation lead to greater competition for resources.

Agricultural development in poor countries will automatically be pro-poor, through increased incomes for farm families and attendant rural sector linkages, including nonfarm income opportunities, and, more importantly, through reduced food prices, the result of increased efficiencies in production and marketing, since the poor spend a major proportion of disposable income on food.

This report details activities and accomplishments of the Agency and its partners in addressing the objectives of the Title XII legislation during FY 1999. During this year, over $300 million in USAID funding was invested in these efforts. While nearly 40 percent of these investments were again concentrated in the Middle East, significant investments in Africa and in global programs also continued, with several important new initiatives underway.

This report, like last year's, is shaped around the priorities outlined in the *U.S. Action Plan for Food Security*, a joint effort of the sub-Cabinet level Interagency Working Group on Food Security and the non-governmental Food Security Advisory Committee (FSAC), a subcommittee of the Board for International Food and Agricultural Development (BIFAD). The Action Plan represents the U.S. Government's response to the 1996 World Food Summit, in which the United States and 185 other countries pledged to reduce the number of undernourished people by half by 2015.

SECTION I
TITLE XII FY 1999 ACTIVITIES

OVERVIEW

Recorded obligations for agriculture programs in FY 1999 rose slightly from 1998, and exceeded the Agency's $305 million target. Obligations for most bureaus remained fairly constant or even increased slightly. In terms of funding source, Development Assistance (DA) and the Economic Support Fund (ESF) each accounted for roughly $135 million, with the balance coming from the special Europe and Eurasia regional accounts.

Table 1: USAID Agriculture Obligations by Bureau ($ 000)*

	FY93	FY94	FY95	FY96	FY97	FY98	FY99
AFR	115,215	124,517	111,734	80,123	80,186	77,912	82,060
ANE	111,230	94,883	114,329	93,569	56,828	131,906	130,420
E&E	87,968	87,090	60,983	32,109	31,525	34,200	40,938
LAC	48,084	43,919	50,182	32,682	28,958	28,777	35,162
G	78,919	56,297	85,016	64,040	42,663	37,738	38,777
BHR	5,195	6,191	12,286	5,302	2,736	4,239	1,941
PPC	2,978	2,361	0	0	1,858	2,300	3,100
Total	**449,589**	**415,258**	**434,530**	**307,825**	**244,754**	**317,072**	**332,398**

*Does not include sustainable agricultural activities coded as environmental activities.

GLOBAL BUREAU PRIORITIES AND PROGRAMS

USAID budgets are required to meet targets in both environment and agriculture (including food production/processing/safety) sectors. While the Office of Agriculture & Food Security in the Global Bureau's Center for Economic Growth and Agricultural Development (G/EGAD/AFS) budget contains certain funds that the USAID budget attributes to other than agricultural targets, the content and objectives of G/EGAD/AFS programs remain focused upon food availability, food access and agricultural sustainability in conformity with the Agency strategic plan. In FY 1999 there was an increase to Global Bureau investments in agricultural research and development.

During FY 1999 G/EGAD/AFS continued to support research, capacity-building, outreach and food-sector policy reform. To convey the official American response to the 1996 World Food Summit objective of less than 400 million undernourished people in the world by 2015, an inter-Agency *U.S. Food Security Action Plan* was released in March 1999. In that plan a series of U.S. Government policy objectives were set. G/EGAD/AFS plays a pivotal role in four of them:

- ? Research and Education
- ? Food Security and Poverty Reduction
- ? Biotechnology and Genetic Resources Policies
- ? Sustainable Agriculture Environmental Policy

Table 2: Global Bureau's Agriculture and Food Security Office Obligations ($)*

	FY97	FY98	FY99
Consultative Group on International Agricultural Research (CGIAR)	24,400,000	24,370,000	24,450,000
Collaborative Research Support Programs (CRSPs)	18,300,000	18,100,000	18,050,000
International Fertilizer Development Center (IFDC)	2,000,000	2,000,000	2,100,000
Spring Time Winter Wheat Program (SXWW)	200,000	295,000	0
Postharvest Collaborative Agribusiness Support Program (CASP)	1,000,000	1,000,000	250,000
Agricultural Biotechnology for Sustainable Productivity (ABSP)	831,312	868,367	869,000
Food Security II (FSII)	500,000	300,000	527,000
Agricultural Policy Analysis Project III (APAP III)	300,000	252,017	10,000
Rural and Agricultural Incomes with a Sustainable Environment (RAISE)	0	0	157,000
Agribusiness and Marketing Improvement Strategies Project II (AMIS II)	189,000	0	0
Program Support	1,900,047	0	2,004,965
BIFAD Support	[20,000]	[126,500]	150,000
Child Survival Initiative	0	0	1,128,000
Africa Food Security Initiative	0	1,888,000	0
Dairy Directive	0	0	0
Sub-Total	**49,620,359**	**49,073,384**	**46,424,861**
Additional Dairy	2,500,000	1,500,000	984,000
Additional CGIAR Africa	2,000,000	2,000,000	2,000,000
Total	**54,120,359**	**52,573,384**	**52,679,965**

*This table includes obligations coded as environmental activities.

Research and Education

As Table 2 above indicates, most of the resources managed by G/EGAD/AFS support agricultural research and education. The support is channeled largely through the International Agricultural Research Centers (IARCs) supported by the Consultative Group on International Agricultural Research (CGIAR), and the nine Collaborative Research Support Programs (CRSPs) that mobilize the efforts of more than 50 U.S. universities and counterpart organizations in developing countries. Education for capacity building in developing countries is an important element in both the IARC and CRSP programs.

Food Security Policy and Poverty Reduction

The G/EGAD/AFS food policy program, implemented with Michigan State University and Associates in International Resources and Development (AIRD), set a policy implementation agenda for food aid and agricultural markets for both U.S. and European Union activities in eight food deficit countries. A number of these food policy considerations were worked into a new Food Aid Convention at the International Grains Council in 1999. Post World Food Summit food security policy reform benchmarks were also derived from this program for:

- ? U.S. agricultural trade negotiators to use in Seattle World Trade Organization (WTO) meetings
- ? Poverty Reduction Guidelines of the Development Assistance Committee (DAC) at the Organization for Economic Co-operation and Development (OECD)

- ? World Development Report on Poverty at the World Bank
- ? Poverty Reduction Strategy Paper methodology of the World Bank and the International Monetary Fund (IMF)

Biotechnology and Genetic Resources Policies

AFS has leveraged its technology research investments to inform broader policy dialogues on biotechnology regulation, intellectual property rights, and genetic resources policies. Through the Agricultural Biotechnology for Sustainable Productivity Project (ABSP), collaborative research on biotechnology is linked to policy development, providing the technical underpinning that meets U.S. interests in science-based biotechnology regulations and strengthened intellectual property protection. At the same time, developing countries have benefited from improved access to biotechnology, strengthened scientific capacity, and, in some cases, are beginning to manage intellectual property to serve national interests. In addition to ABSP, our support to the CGIAR has led to engagement in an international dialogue on genetic resources policies, a counterpoint to intellectual property policies that address issues of access to and benefits from genetic resources use. Based on the experience of these programs in policy dialogue with developing countries and the on-the-ground implementation of policy, USAID has engaged in larger international debates, among them:

- ? Implementation of the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)
- ? Negotiation of the Cartagena Protocol on Biosafety
- ? Food and Agriculture Organization ((FAO) International Undertaking on Plant Genetic Resources
- ? Public-private sector approaches by the World Bank and CGIAR

Sustainable Agriculture Environmental Policy

AFS and its partners at the Sustainable Agriculture and Natural Resource Management (SANREM) CRSP and FAO have been key players in reviewing progress, in the context of agriculture and related land-use, towards achieving the goals contained in the Rio Declaration on Environment and Development and Agenda 21: Program of Action for Sustainable Development. In 1999, SANREM took the lead in framing the major issues in important policy dialogue leading up to multilateral dialogue on sustainable agriculture and rural development at the Eighth Session of the UN Commission on Sustainable Development (CSD-8) held in CY 2000.

Preparatory to CSD-8, the SANREM CRSP played a central role in broadening participation in the debate over the controversial concept of multifunctionality, an analytical framework introduced to encompass the range of associated environmental, economic, and social functions of agriculture. Multifunctionality proponents claim that production-linked payments, or subsidies, are necessary to obtain socially-desired nonfood benefits. Opponents view the concept as a cloak for a protectionist trade agenda and a justification for continued domestic support to agriculture. An innovative electronic conference launched by SANREM at FAO in February 1999 involved over 1300 people from 80 countries and contributed significantly to framing the key issues, catalyzing discussion, and generating background documentation, including an analysis of case studies to explore areas of impact of multifunctional agriculture.

AGENCY TITLE XII PROGRAMS BY REGION

Africa (AFR)

Sub-Saharan Africa still endures widespread food insecurity, hunger, conflict and malnourishment, and is a major focus of USAID's efforts in the area of agricultural development. While food security trends are improving in some specific nations, the continent as a whole continues to suffer from declining food security. Population growth exceeded production growth, making Africa home to increasingly large numbers of malnourished persons. The implications are profound in terms of human suffering, economic development prospects, and linkages to export markets, including the US-based food and agriculture sector. Africa is also faced with the burdens of declining world market prices for the region's traditional (largely agricultural) exports, and accordingly a declining share (about 2%) of world agricultural trade. In addition, the raging HIV/AIDS pandemic now poses a new dimension to the problems facing all sectors, including agriculture. Thus, the challenges facing African agricultural development are both pressing and formidable.

Table 3: Africa Bureau Agriculture Obligations by Country ($ 000)

Country	1997	1998	1999
Angola	8,170	6,600	4,620
Eritrea	3,225	2,005	1,850
Ethiopia	4,080	3,614	7,764
Ghana	1,270	3,456	4,248
Guinea	150		
Guinea-Bissau	1,665		
Kenya	2,200	2,703	2,000
Liberia	927	6,093	1,589
Madagascar	1,000	1,500	
Malawi	7,000	5,175	10,211
Mali	5,627	7,749	7,562
Mozambique	11,600	14,000	9,200
Niger	600		
Nigeria			1,000
Rwanda	873	2,800	3,000
Senegal	3,428	445	1,263
Somalia	270	875	
Tanzania			2,000
Uganda	5,790	7,039	7,500
Zambia	749	2,195	2,000
Zimbabwe			1,500
REDSO/EA	7,225	635	3,147
SA Regional	1,598	2,675	2,820
Sahel Regional	1,694	2,382	1,470
Africa-wide (AFR/SD & DP)	10,567	5,971	6,417
CGIAR			2,000
GHAI	478		
Total	**80,186**	**77,912**	**82,060**

The primary emphasis in USAID's agriculture programs in Africa remain the key areas of increased incomes and improved child nutrition. Experience has demonstrated that the most effective means to achieve these goals are through increasing agriculture production, improving marketing and market

access, and increasing agriculture trade and investment. Focusing on small-scale farmers and the policies and businesses that best serve them remains critical. During FY 1999, Title XII institutions were utilized to provide support to African agricultural development in these areas through both *regional programs* and USAID *mission funded activities* in specific countries. Examples of each are in this section.

The regionally funded programs included major efforts to address policies that constrain regional trade; establish uniform and internationally acceptable grades and standards for both agricultural inputs (e.g., seeds) and agricultural commodities grown for trade; draft uniform phytosanitary regulations; and analyze regulations that inhibit regional trade and diminish food security.

U. S. university involvement in USAID's agricultural development activities in Africa was significant. Both Penn State and the University of California-Davis contributed to the conceptualization of the regional *Sustainable Tree Crops Development* activity. This initiative focuses on merging interests of African small-holder producers and medium and larger scale entrepreneurs involved in processing and exporting fruit and nut tree products (specific crops include cocoa, coffee, and cashew) with the U.S. and other developed country industries. This activity assisted in improving access to tree crop technology, improving infrastructure, developing grades and standards for product marketing, and updating and improving the efficiency of tree crop processing. Importantly, this activity addresses cropping systems across country borders, including the cocoa sub-sector region of West Africa.

Michigan State University worked with USAID missions in Mozambique, Zambia, Kenya and Mali to improve national agricultural and food security policies. Principle activities focussed on improved food aid targeting, establishment of market information systems to give small producers access to better market prices, promotion of broadly based agribusiness activities to raise farmer incomes, and the promotion of policies to enhance long-term agricultural resource productivity.

Through the *Natural Resource Management InterCRSP*, Virginia Tech worked to strengthen the transfer of processing, marketing, production and natural resources management technologies to Burkina Faso, Cameroon, Cape Verde, Chad, Ghana, Gambia, Mali, Niger and Senegal.

In collaboration with the University of California-Davis and the University of Nebraska, the *Association for Strengthening Agricultural Research in East and Central Africa* (ASARECA) promoted regional economic growth by developing, introducing and disseminating new agricultural technologies that create new markets and respond to prevailing and future economic opportunities. The Association includes as members 10 national research systems involving more than 3,000 African agricultural scientists working in over 150 separate institutes.

Implemented in collaboration with Purdue, Texas A&M, Michigan State, and other universities, the *Economic Impact Assessment of Agricultural Interventions* activity assisted USAID missions, African leaders and other donors to strategically assess the impact of agricultural interventions in Africa on sustained economic growth, including the impact of agricultural interventions on sustained use of natural resources. The activity helps mobilize the will and resources to support agriculture, guide allocation of resources in the agricultural sector to achieve the greatest impact on society's interests, and help ensure the accountability of resources committed to agriculture by examining impact derived from these resources.

Led by Michigan State and Penn State Universities, the regionally-funded *African Biotechnology Partnership* promotes the development, transfer, and adoption of crop and livestock biotechnologies for improved agricultural productivity. In this context, it fosters policy development to facilitate

access to and private sector investment in biotechnology, and facilitates development of regional strategies to link national and regional partners. The African partner is ASARECA and its 10 member states.

Implemented in collaboration with Michigan State University and other partners, the *Food Quality Grades and Standards* activity promotes regional and international market access and market development for African agricultural exports. This activity increases awareness and capacity to meet market-specific and international quality and environmental grades and standards. Targeted private sector groups include trade federations, producers, the food processing industry, wholesalers, and exporters.

Several universities, including Georgia, Nebraska, Purdue, Michigan State, Texas A&M, and Oregon State, in partnership with CGIAR and local institutions support the *Commodity Networks.* This regional activity is designed to promote and facilitate capacity building of networks around selected commodities (e.g., maize, sorghum, rice, cowpeas, vegetables, root crops, natural products) across countries with a high impact on incomes, employment, and nutrition. These networks disseminate new technologies through collaborative regional activities, develop market mechanisms in the public and private sector to increase access to regional and international markets, promote policies to enhance private sector participation in regional trade in agricultural inputs and outputs, and support the development of market information systems necessary to link farmers and marketing organizations.

Latin America and the Caribbean (LAC)

A key goal of the USAID FY 1999 regional program is to reduce poverty. Consistent with the Summit of the Americas and Global Action Plan on Food Security objectives, efforts focus on equitable growth stimulated by free trade, job creation, better heath and education systems, and the sustainable use of resources. To make the most efficient use of limited funds, several LAC countries target interventions at the sub-national level, with emphasis on rural areas, regional secondary cities, and economic growth corridors.

Table 4: LAC Bureau Agricultural Obligations by Country ($ 000)

Country	1997	1998	1999
Bolivia	6,000	688	400
Ecuador	105		
El Salvador	3,049	3,406	3,205
Guatemala	3,493	5,412	8,380
Haiti	2,098	1,400	10,154
Honduras	1,768	559	945
Jamaica	440		
Nicaragua	3,299	5,084	5,500
Peru	7,626	3,832	1,535
LAC Regional	1,080	8,396	2,508
Total	**28,958**	**28,777**	**32,627**

There are a number of examples of USAID-supported growth in specific agricultural sectors. In Guatemala, the number of small farmers using defined sustainable agriculture practices to produce coffee, organic crops, and agroforestry products increased from 4,000 in 1998 to 17,500 in 1999. This shift is leading to increasing rural household income and food security. In Haiti, the South-East Consortium [of universities] for International Development (SECID) partnered with USAID in

helping hillside farmers to achieve sustainable increases in on-farm productivity and farmer income. This was done through the integration of appropriate soil and water conservation practices and the introduction of trees, shrubs, grasses, and other plant materials, in order to enhance soil fertility.

Increased agricultural productivity relies on the development and spread of new and improved technologies through agricultural research. Several CRSPs were active in research and technology transfer efforts in the LAC. One example is the International Sorghum and Millet (INSORMIL) CRSP, which has conducted collaborative research with scientists in El Salvador, Honduras, and Nicaragua and several universities in the U.S. focus on removing constraints to the production and utilization of sorghum and pearl millet.

Other related activities include assistance to Central American countries in their recovery efforts from the 1998 hurricanes, Mitch and Georges. Activities include repairing such infrastructure as farm to market roads and assisting small farmers to reestablish crop and livestock production.

Table 5: FY 1999 CRSP Activities in the Latin America and Caribbean Region

	INTSORMIL	BASIS	BEAN/COWPEA	LIVESTOCK	IPM	PEANUT	POND DYNAMICS	SANREM	SOILS
Bolivia				✍		✍		✍	
Brazil									✍
Costa Rica			✍						✍
Dominican Republic			✍						
Ecuador				✍	✍			✍	✍
El Salvador	✍	✍							
Guatemala	✍				✍				
Haiti						✍			✍
Honduras	✍		✍				✍		✍
Jamaica					✍				
Mexico	✍		✍	✍			✍		
Nicaragua	✍	✍							✍
Peru							✍	✍	✍
Uruguay	✍								

Asia and the Near East (ANE)

In FY 1999, one of Asia's largest countries, Indonesia, continued to struggle with a transition from autocracy to democracy in the midst of a drought and a protracted economic crisis. And, Middle East countries continued to receive substantial funding to support the peace process.

The Agency invested in bilateral programs with agricultural components in seven ANE countries: Bangladesh, Egypt, Indonesia, Jordan, Laos, Nepal, and Sri Lanka. Egypt and Jordan accounted for 93% of this investment. The work in Egypt stresses agriculture policy reforms and private sector export-oriented growth. In Jordan, Purdue and Washington State Universities' work emphasizes improved water resources management, with irrigated agriculture as a major component.

Improving food security and alleviating malnutrition remain extremely important goals in the region, where more than one-half billion of the region's residents are undernourished. According to the United Nations Children's Fund (UNICEF), in 1999, 51% of children in South Asia under five years of age are underweight and 52% show moderate to severe stunting, evidence of long-term under nutrition.

Bangladesh's program focused on food security for the poorest elements of the society, increased agriculture based enterprises, and promoted export crops, while the program in Indonesia was directed towards food policy and management practices. Nepal's program was designed to increase sustainable production and sales of forest and high-value agricultural products and the program in Laos focused on improving policy and technology for the silk industry. Finally, the program in Sri Lanka worked to improve the policy framework for trade and investment resulting in expanded and strengthened private markets.

Table 6: ANE Bureau Agriculture Obligations by Country (million $)

	1998	1999
Bangladesh	2,941	2,800
Cambodia		
Egypt	90,500	100,142
India		
Indonesia	5,600	2,412
Jordan	31,865	20,000
Laos		1,500
Lebanon		
Nepal	1,000	1,000
Philippines		
Regional Program		1,566
Sri Lanka		1,000
Total	**131,906**	**130,420**

Europe and Eurasia (E&E)

USAID agricultural sector assistance to the countries of the Former Soviet Union and Central and Eastern Europe continues to be heavily focused on land reform and agribusiness development. More limited assistance is being provided to other agriculture sub-sectors such as extension and policy formulation and reform.

The regional agricultural program in several E&E countries supported reintroducing private land ownership. This includes supporting the development and enhancement of an effective land registration system leading to development of land markets. Assistance covers all aspects of land ownership, registration, institutional development and support, land cadastre, and promoting the passage of related legislation for the countries in transition. This program receives only slightly less funding than all other agriculture programs combined. The University of Wisconsin's Land Tenure Center along with other contractors is the implementing institution for the land market development work in Albania. The Land Tenure Center also serves as the Agency's on-going research and documentation partner on land-related issues. In the Newly Independent States region, land privatization and titling projects are being implemented in Ukraine, Moldova, Georgia, Armenia and the Kyrgyz Republic.

Agribusiness development activities in the former Soviet Union, implemented, for the most part, through non-governmental organizations (NGOs), are carried out in Ukraine, Russia, Moldova, Georgia, Armenia and Azerbaijan. Support for agricultural extension development is provided in Armenia and Ukraine, and agricultural policy assistance is provided in Ukraine. The latter activity is being implemented by Iowa State University, and the Ukraine agricultural extension work is being supported by Louisiana State University.

In the Central and Eastern Europe region, USAID assistance is concentrated in the "Southern Tier" countries of Albania, Macedonia, Bulgaria, Bosnia, Croatia and Romania, and in Kosovo and Montenegro. In most of these countries agriculture is a significant contributor to both gross domestic product (GDP) and employment, with livestock of particular importance. Almost every household in the rural sector owns some livestock and milk, cheese, and yogurt are in high demand. Consequently, most of USAID's agricultural and agribusiness involvement in these countries focuses on the processing and marketing of livestock products, with attendant connections to the production and policy dimensions. An interesting example of this work is the Macedonian Agribusiness Marketing Activity (MAMA), being implemented by Land O'Lakes (see text box below).

Box 1: The Macedonian Agribusiness Marketing Activity (MAMA)

MAMA is a five year, $6.8 million USAID funded project, started in April 1998, with Land O'Lakes (LOL) as the lead contractor. The project's objective is to accelerate the development of free market, value added capacity in the meat and dairy sectors in Macedonia. Currently, production agriculture accounts for roughly 17% of Macedonia's GDP, of which livestock is the single largest subsector. Historically, agricultural products produced in Macedonia were processed and marketed in other parts of ex-Yugoslavia.

In an extensive consumer survey undertaken in early 1998, Macedonian consumers expressed a clear preference for Macedonian products, but also viewed the domestic products as inferior. In response, LOL devised a livestock sector development strategy built around an industry-managed food quality program, known as the Seal of Quality. The Seal of Quality is owned by the Association of Private Meat and Dairy Processors of Macedonia and it is their registered trademark. The right to display the Seal of Quality, with its logo "With Pride From Macedonia", is given to firms whose products meet quality standards that parallel those of western meat and dairy products. The Association has a food testing laboratory and a quality control protocol. Technical support is provided by LOL to assist firms to keep pace with the demands of the market in areas of quality control, production, business development, and marketing.

The Seal of Quality program was implemented in 1999 through a multi-media national campaign. The results have been dramatic. Companies with the Seal of Quality have increased sales by 45% and investments in meat and dairy small and medium sized businesses have increased by $3.75 million More than 100 new products have been developed based upon market demand, and consumer recognition is high, with a 72 percent consumer recognition of the Seal of Quality as a symbol of superior quality, Macedonian-produced products. In addition, by creating a strategic partnership with retailers, the Seal of Quality has boosted the retail and wholesale/distribution segments of the marketing chain through an expansion in employment and investment. The Seal of Quality "With Pride From Macedonia" is becoming a sought-after designation, and is serving to stimulate a modern livestock industry through development of a consumer market for high quality, domestically produced meat and dairy products.

Other areas of emphasis include private, commercial agribusiness input supply, and development of agricultural professional and trade associations. In Albania, Mission support to the International Fertilizer Development Center helped privatize fertilizer dealerships and

other input supply markets. There is also a small Integrated Pest Management (IPM) CRSP activity in Albania led by Virginia Polytechnic Institute and State University.

P.L. 480, TITLE II FOOD FOR PEACE NON-EMERGENCY PROGRAM

The *U.S. International Food Assistance Report 1999* (USAID, January 2000) notes that in FY 1999, Food Assistance Programs (including Title II) made up over 23 percent of U.S. Foreign Assistance. Title II (including both Emergency and Non-Emergency Programs) accounted for $949 million. Almost half of Title II funds ($435 million) were used for development, i.e., non-emergency, activities. Regionally, $170 million (39%) was used to support development activities in Asia/Near East (41%), in Africa (32%) and in Latin America and the Caribbean (27%). This represented a significant increase of $40 million in the Asia/Near East Region, and $40 million in Africa from the previous year. More than half of the 42 countries receiving Title II funding are in Africa.

Table 7: P.L. 480 Title II Total and Non-Emergency Funding: 20 largest recipient countries in FY 1999

Country	Emergency Funding ($ 000)	Non-Emergency Funding ($ 000)	Total Funding ($ 000)
India	0	138,536	138,536
Ethiopia	32,950	36,380	69,330
Sudan	67,816	0	67,816
Balkans Region	57,086	0	57,086
Peru	0	53,059	53,059
Honduras	41,437	5,563	47,000
Korea (DPRK)	46,665	0	46,665
Bangladesh	0	46,356	46,356
Indonesia	34,576	0	34,576
Angola	33,876	0	33,876
Tanzania	31,354	465	31,819
Guatemala	6,537	17,895	24,432
Mozambique	0	24,157	24,157
Uganda	9,413	11,499	20,912
Ghana	0	20,370	20,370
Bolivia	0	20,059	20,059
Haiti	0	16,981	16,981
Sierra Leone	16,114	0	16,114
Burkina Faso	0	15,038	15,038
Liberia	12,857	0	12,857
Sub-Total	**390,681**	**406,358**	**797,039**

U.S. International Food Assistance Report 1999, United States Agency for International Development, January 2000, Appendices 4 and 5, pp. 66-69.

PL 480, Title II Development (Non-Emergency) funding is becoming a major source of financing for agricultural and food security activities. Priority is given to activities that improve household nutrition and agricultural productivity. Funds are used by NGOs to provide technical assistance and training to small farmers and their families. Activities promote sustainable farming practices, more productive and diversified farming systems, improved post-harvest management, marketing, and

natural resource management. Michigan State University and the Academy for Educational Development provide ongoing assistance in targeting and measuring the impact of food aid programs.

In Ghana Title II programs were used to develop sustainable rural enterprises and small and micro-credit programs that contribute to improved food security in rural areas. In FY 1999, 276 local businesses and community based enterprises received technical assistance from Technoserve/Ghana. Also in Ghana, Adventist Development and Relief Agency (ADRA)/Ghana's Title II agroforestry program trained more than 6,000 farmers and 10,000 continuing clients and provided them with inputs to intercrop tree seedlings with maize, yams and soy beans. More than 1000 improved grain storage facilities were constructed, resulting in a reduction in post-harvest losses from 30 percent to 5 percent for these households.

Farmers involved in the CARE/Honduras Title II-funded Agricultural Extension for Food Security (EXTENSA) program saw grain yields increase by 22.5 percent during the past 2 years. Many of these farmers produce a marketable surplus and have experienced an increase in their incomes.

In India, Catholic Relief Services and the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) collaborated to introduce legume crops as a second crop during the rice fallow period. An on-farm research and demonstration effort has led to wide adoption of this intensification technique among farmers enhancing food security through increased protein in diets, improved soil fertility, and increased animal feed and fuel.

Title II food commodities support the Bangladesh government's school-feeding program. The Government of Bangladesh pays for the food in local currency and funds generated are used to finance a variety of rural works including flood protection, rural roads, tree planting and slope protection.

FY 1999 ACCOMPLISHMENTS

Policy Environment

"Over 50 percent of the populations of Ethiopia, Angola, Mozambique, Haiti, Somalia, and the Central African Republic are hungry." (*U.S. Action Plan on Food Security: Solutions to Hunger*)

Food Security II

The Global Bureau's Food Security II (FS II) Cooperative Agreement continued its work with African partners on a broad array of applied food and agricultural policy research, outreach, and human and institutional capacity strengthening activities. The results represent a joint product of applied research and outreach from African research partners and Michigan State University staff, and reflect financial contributions from the Africa Bureau and field missions.

FS II works in five key areas:

- ? Improving the access of vulnerable groups to food aid through improved targeting
- ? Strengthening policies to promote sustainable income growth through promoting of broadly based agribusiness activities
- ? Promoting long-term enhancement of agricultural resource productivity

- ? Facilitating the improvement of more effective food systems through improved market information
- ? Facilitating cooperator skill development and articulation of an African perspective on food and agricultural policy and structural transformation of African economies

In Ethiopia, FS II focussed on food aid targeting, successfully underscoring the

- ? Limitations of area-based targeting
- ? Need for food aid logistical systems in almost all areas
- ? Need for targeting procedures that are capable of distinguishing between the needy and relatively less needy

Research conducted on smallholder agricultural commercialization (Kenya, Mozambique, and Zimbabwe) identified key attributes of successful and unsuccessful agribusiness and outgrower operations.

Productivity enhancement research focussed on:

- ? Fertilizer and seed sector development in Sub-Saharan Africa
- ? Methods to assess
  --constraints and opportunities for input sector transformation
  --financial and economic profitability of technology transfer programs
  --target crops and zones for fertilizer promotion
- ? Case studies carried out with USAID missions analyzing constraints to input sector development

Box 2

In Mozambique, FS II staff worked with the Policy Analysis Department and the Director of Economics of the Ministry of Agriculture and Rural Development to define and refine cashew export and sugar industry policies. The USAID Mission supported the Ph.D. thesis research of a Mozambican who is now a recognized authority on cashew policy in Mozambique. Though political considerations prevented the Ministry from officially adopting the position advocated by FS II analysis, the Ministry and the sugar industry have continued to solicit input from FS II on this issue as it dialogues with the IMF and World Bank regarding macro and trade policies.

FS II continues to work with Sasakawa Global (SG) 2000**,** an initiative led by former President Carter, Global 2000, and the Sasakawa Africa Association of the Nippon Foundation, to contribute to the improvement of the standard of living of people through improved food security in Africa. FS II/SG collaboration has strengthened extension services in Ethiopia, Mozambique, and Mali to monitor the impact of SG programs promoting the adoption of new technologies.

In Mozambique, as a result of study recommendations, the SG program began working closely with farmer associations. The Research and Extension Divisions of the Ministry of Agriculture initiated fertilizer trials and are beginning to recommend lower fertilizer applications rates in Nampula Province. FS II analysis of the Japanese-financed input supply program led to changes in program management and ongoing discussions about major restructuring of the program.

In Mali, FS II helped restructure the national agricultural market information system (MIS), and secured sustainable funding for it. The MIS increased the number of commodities covered, the frequency of data update, and accessibility to farmers and entrepreneurs. In three years, largely because of FS II activities, the Malian government agreed to assume all MIS operating costs.

The Agricultural Policy Development Project (APD) and DAC Poverty Work

The APD project addresses policies that encourage increased agricultural employment and efficient agricultural markets. It helps bureaus, missions, and host-country decision-makers identify issues and resolve problems involving agricultural policy distortions. Issues on trade reform, market performance, food equity, agricultural sustainability, and poverty reduction are given priority attention. With most of the poor residing in rural areas, agricultural policies are a crucial component in any poverty reduction policies that USAID and developing country decision makers undertake.

APD is actively involved in supporting USAID's work on the OECD-DAC's Poverty Reduction Network (PRN) and contributes to Agency policy formulation and response to the new "Poverty Reduction Strategy Papers" (PRSPs) associated with the new approaches being lauded by the World Bank and IMF.

Trade and Investment

Trade and investment present new opportunities and challenges for developed and developing countries alike. In theory, they are complementary: when developing countries export, they earn income to pay for imports. These imports provide goods and services needed for consumption and investment, as well as technology that can spur new innovation and investment in the local economy. Conversely, developing countries are an increasingly vital market for U.S. exporters. U.S. exports to developing countries rose from 27 to 32 percent during the 1990s alone. But many of the least developed nations have been unable to participate meaningfully in world trade. Participation in the WTO can be expensive, procedures complex, and compliance with agreements difficult to achieve.

It is in the interest of the United States to ensure that globalization provides opportunity for all. USAID and its partners have a unique opportunity to provide critical technical assistance to address issues such as:

- Trade policy reform and procedures for implementing standards
- Helping governments and local food industries meet new food safety and quality standards.
- Rule of law and legal, regulatory, and judicial frameworks for economic activity
- Customs valuation and business facilitation
- Assistance to gain WTO accession and to fully participate in WTO negotiations
- Intellectual property rights
- International standards for the protection of workers' rights
- Protection of the environment while increasing trade
- WTO and poverty reduction strategies

Within the framework of its mission and strategic objectives, USAID recognizes and seeks to maximize the contribution of trade to development and the contribution of development to mutually beneficial trade. Toward that end, USAID is committed to promote and collaborate in the development of an open, rules-based global trading system through:

- ? Assistance programs that increase the capacity of developing and transition countries with respect to sound trade-related policies, effective public institutions, competitive private sectors and informed civil societies; and
- ? Encouragement of U.S. trade policies and international rules that increase the opportunity of developing and transition countries to achieve greater progress in their development through increased trade

USAID and its development partners' efforts focused primarily on research and design and overall capacity development. For example, the Emerging Markets' group promoted research, evaluation and new "product" design for the benefit and use of USAID generally, but also to enhance the capacity of bilateral and regional programs that assist developing countries in their business, trade and investment initiatives. The following four products are examples of these efforts:

- ? Commercial Policy Tool Kit
- ? Manual for Action in the Private Sector (MAPS)
- ? Information Technology for Development
- ? Country Competitiveness Scope of Work

Direct capacity building efforts included WTO awareness workshops, a WTO ministerial conference symposium on donor assistance for Africa in advance of the Seattle WTO meetings and African national and regional capacity building in trade policy. Under the African Trade and Investment Policy Program, Purdue University developed a model for region wide investments in electrical power generation and transmission facilities. Under USAID's Agricultural Biotechnology for Sustainable Productivity Project (ABSP), Michigan State University led efforts to provide a favorable policy environment for investment and commercialization of bio-engineered agricultural products.

Issues such as labor standards, trade policy institution-building, procurement transparency, and the environment were tackled in Central Europe and Eurasia, Africa and Latin America. Also, USAID funding for microenterprise development helps small entrepreneurs take advantage of trade opportunities. In Peru, the Microenterprise and Small Producer Support Project provided international trade and marketing training and assistance to microentrepreneurs involved in handicraft production. Since the mid-1990s, enterprises participating in this program have increased sales by over $24 million and added nearly 7,000 full time jobs.

In the Caribbean, USAID fosters the hemispheric economic integration process through technical assistance to support:

- ? Compliance with WTO obligations
- ? Business facilitation measures (e.g., customs)
- ? Civil society participation in the process of negotiating external trade agreements

The United States favors continuation of movement toward an open, rules-based trading system and is prepared to support the efforts of developing countries to compete in the global economy. USAID programs and expertise strengthen human and institutional capabilities to meet the new challenges and take advantage of emerging opportunities.

Research and Educational Capacity Building

Global Scientific Research: The CRSPs

Innovative technologies are key to development. When technological advances result from collaborative activities between U.S. and developing-country scientists, institutional growth and improved human resources capacity occur on both sides. USAID conducts collaborative research to improve the sustainability of food production systems in developing countries with an emphasis on and to develop institutional/human capacity to sustain research contributions to the development process, enhancing the quality of life for small-scale crop, animal and fish farmers. The Agency's CRSPs are long-term, multidisciplinary research and training initiatives that capitalize on the vast U.S. land grant university systems and other U.S. universities that work with developing-country research programs.

There are currently nine CRSPs:

Bean/Cowpea
Broadening Access and Strengthening Input Marketing Systems (BASIS)
Global Livestock (GL)
Integrated Pest Management (IPM)
Peanuts
Pond Dynamics/Aquaculture (PD/A)
Soils Management (Soils)
Sorghum/Millet (INTSORMIL)
Sustainable Agriculture and Natural Resource Management (SANREM)

The CRSPs involve 50 land-grant universities in 33 states. CRSPs seek to resolve problems whose solutions will be mutually beneficial to both the U.S. and developing countries in the areas of increased food production, improved distribution, storage, processing, marketing and policy development. They achieve their objectives through research, training (short and long-term), and institutional development. The CRSPs are true partnerships, requiring a minimum 25% match on the part of the U.S. universities and a developing country partner contribution of scientists, facilities and, when possible, financial resources.

In FY 1999, significant benefits resulted from work by the CRSPs. For example:

<u>Increased Productivity</u>

IPM CRSP work in the Philippines shows the possibility of drastically reducing, if not totally eliminating, insecticide use in eggplant fields. Research showed that replacing insecticides with properly timed removal of damaged shoots and fruits, together with the already existing sanitation measures (disposal of damaged fruits from the field along with the harvesting schedule of farmers), could produce good results. As a result, insecticide application is down drastically, resulting in both environmental and farmer financial benefits.

A Livestock Early Warning System (LEWS), that predicts drought and potential famine conditions, as well as projecting the future nutritional value of vegetation, has been developed in East Africa by the Global Livestock CRSP. This system allows 6-8 weeks of increased lead-time for pastoralists in 120,000 square kilometers monitoring zones to make adjustments in livestock numbers and for policy makers to devise appropriate interventions. Livestock mortality losses should be cut in half, saving

234,000 cattle, 735,000 goats and 731,000 sheep every 4-8 years -- a direct value to pastoralists of $US 101.9 million over the period.

Treatment with the hormone Methyldihydrotestosterone (MT) was shown by the Pond Dynamics/Aquaculture CRSP to be an effective method of producing all-male tilapia populations. This is valuable because males grow faster than females and because monosex populations use energy for growth rather than reproduction, yielding fewer, larger fish.

Agribusiness

In 1999, 20 tons of hybrid sorghum (NAD-1), developed by the INTSORMIL CRSP, were produced and sold in Niger. This hybrid seed was sold at 8 times the price of market grain. Interest in seed production continues and demand for hybrid sorghum seed continues to exceed supply. In 1999 about 30 individuals with interest in seed production and marketing joined together to form a Nigerian Seed Producers Association with assistance from the INTSORMIL CRSP. The privatization and commercialization of the sorghum hybrid seed industry in Niger is built upon almost 15 years of INTSORMIL activities including laboratory research, on farm trials, and the training of farmers to produce hybrid seed. INTSORMIL collaborative research continues to strengthen the commercial production of sorghum in Niger, a country that is now poised to serve as a node from which hybrid sorghum seed production can spread into West Africa.

Introduction of High Quality Food

In 1999, following the near total destruction of the bean crop by Hurricane Georges, the Bean/Cowpea CRSP helped Haitian farmers plant 100 hectares of land with Arroyo Loro Negro, a black bean developed by a CRSP team of Dominican Republic and University of Nebraska researchers. The highly improved variety (high yielding with significant disease resistance) had previously been tested over a ten year period by Haitian scientist, Dr. Emmanuel Prophete, and determined to be well adapted to Haitian conditions. The CRSP team in the Dominican Republic was authorized by the Management Entity to contract with Dominican Republic farmers to plant Arroyo Loro Negro for subsequent sale to Haiti. The Haitian government purchased the seed, which was subsequently distributed to Haitian farmers who planted it and were very satisfied with the results.

Sorghum grain is a staple food of many semi-arid tropical regions of Africa and Asia, and is a major feed crop in the U.S. and other industrialized countries. Although it is a close relative to maize, its macronutrients, protein and starch are less available for digestion. INTSORMIL CRSP researchers have identified a highly digestible protein characteristic of sorghum that shows real promise for improving the grain's human food and animal feed value. Invaginated protein bodies in the seed of some sorghum varieties lead to high rates of protein digestion, and the seed has an elevated level of lysine, thus improving both protein quality and quantity. INTSORMIL cereal chemists and sorghum breeders are making rapid progress in developing lines of sorghum with this characteristic. These improvements to the nutritive value for sorghum grain are important to expanding its production and markets in semi-arid regions where sorghum is food for 500 million people and hardier than other cereals in environments with low rainfall.

Box 3

In the U.S. a brown midrib sorghum sudangrass line developed by an INTSORMIL partner (Purdue University) has increased the feed value of forage by more than 18 percent. The impact of this improved line for U.S. farmers was $9 million of value added benefits in 1999. Acreage of this improved line continues to expand.

The Peanut CRSP released rosette-resistant (virus) cultivars of peanuts in Malawi. These lines were developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), tested and released in Malawi through the CRSP support to the national program and provide a major advance in providing high levels of resistance to the rosette virus disease. USAID in Malawi has joined in this effort and funded seed multiplication of these lines. This should result in adequate quantities of seed to provide a high level of production stability and, thus, greater food security.

In the Philippines, the Peanut CRSP continued work with peanut industries to develop post-harvest and value adding processes. Vitamin A deficiency is widespread in the Philippines, affecting 35 percent of children. A vitamin A-fortified peanut butter, developed through the CRSP, now has 35 percent of the commercial market share, representing approximately seven percent of the total Philippines' peanut butter market.

Box 4

The Peanut CRSP developed a new peanut variety, Tamspan 90, which is higher yielding and more resistant to soil-borne blight and pod rot diseases than existing varieties. Growing in popularity among Texas farmers, Tamspan 90 earned them an additional $12 million in 1999 when it was planted on 28 percent of peanut fields in the state.

More Sustainable Use of Natural Resources

During 1999, SANREM researchers developed decision support models that will aid natural resource management decision-makers. These models are now being fine-tuned based on the participation of decision-makers at the regional workshops.

SANREM CRSP has established collaboration with the FAO Worldwide Agricultural Information Center (WAICENT) to develop and enhance its ability to acquire and use models and related information from research at national and regional levels to contribute to a global system. SANREM models and data will be incorporated into WAICENT's Knowledge Information System (KIMS) and made available to decision-makers at national levels as well as donors to enhance policy decisions. The SANREM product is being incorporated at the global level, ensuring broad accessibility to models and information.

The first version of NuMaSS (Nutrient Management Support System) for diagnosing and correcting soil acidity, nitrogen and phosphorus constraints was released in 1999. The system incorporated published knowledge, data from unpublished "gray" literature and data from Soils Management CRSP validation experiments. NuMaSS is a system superior to anything produced so far and already is being used by a Peach Palm growers association in Central America to cut fertilizer costs and

improve farm efficiency, in the Philippines to make fertilizer recommendations for regional upland rice trials, and in Mali it has doubled yields in the limited area to which it was initially applied.

A new liquid formulation of bacterial inoculant for legumes was released by the Soils Management CRSP. The product is less expensive to produce, lasts more than six months at room temperature, and outperforms (6% yield increases) the classical peat-based inoculant for legumes. If half of the world's producers adopt liquid inoculant formulations, the result could be aggregate yield increases of 1.2 million metric tons per year, -- worth $360 million U.S. The CRSP has promoted discussions between legume inoculant producers in India and U.S. for marketing of liquid inoculants overseas.

Widespread impact is expected from the Global Livestock CRSP's research on carbon dioxide fluxes in the rangelands of Central Asia. The studies are being conducted in coordination with parallel studies in the U.S. Countries in Central Asia, particularly Kazakhstan, will be able to generate "carbon credits" and to attract international investment for mitigation. Eventually, that work on carbon sequestration will have global impacts.

Policy Studies

In El Salvador, The BASIS (Broadening Access and Strengthening Input Market Systems) CRSP contributed to a revised Banking Law by developing an appropriate regulatory framework for rural financial intermediaries. In the Horn of Africa, research on cross-border trade is helping to identify ways to promote inter-regional trade and economic stability. In Zimbabwe, BASIS participates in a multi-donor effort to assist the Government in designing and implementing the second phase of its land reform and resettlement program aimed at broadening access by the poor to land and water resources. In South Africa, BASIS was called upon to provide poverty-related policy recommendations to the Deputy President and nine cabinet ministers.

Global Scientific Research: The IARCs

To achieve Title XII's goals, USAID supports the work of the International Agricultural Research Centers (IARCs) including members of the Consultative Group on International Agricultural Research (CGIAR). USAID funds partnerships among U.S. land grant universities, USDA's Agricultural Research Service (ARS) and the IARCs. In addition to the financial support extended to the CGIAR institutions, USAID staff from the Global Bureau's Office of Agriculture and Food Security participate actively in system governance. The programs of the IARCs continue to contribute substantially to new technology development for major food commodities, policy development and conservation of natural resources. CRSP and IARC generated scientific advances have benefited developing countries and the U.S. as well.

1999 research on the economic returns to IARC investments, led by Dr. Robert Evenson of Yale University, concluded that Green Revolution benefits continue to grow and expand. A comprehensive agro-economic study covered CGIAR impacts on the production of the key crops that feed humanity: wheat, rice, corn, sorghum, pearl millet, barley, lentils, beans, cassava, sweet potato and potato. These crops provide more than 75 percent of total caloric consumption. The study found that the benefits have continued and, very importantly, expanded beyond well-endowed areas into more marginal production zones where farmers face drought, heat, cold and other difficulties. The study found that 50 - 75 percent of yield gains were due to genetic improvement, much of it based on CGIAR breeding work.

On the economic side, the Evenson study found that food prices would have been from 27 to 41 percent higher had it not been for CGIAR research. Higher food prices affect the poor

disproportionately, because poorer people spend much of their income on food. The analysis showed that several million more children would be malnourished but for the benefits of CGIAR research programs. The study also estimated that environmental benefits associated with CGIAR research were enormous. Conservative estimates place the amount of land (woodlands, forest, wetlands) conserved in its natural state because of on-farm productivity gains at more than 400 million hectares. The positive impact of reduced land clearing means millions of hectares of tropical forests and the biodiversity they hold have been conserved. Another 1999 study, funded by USAID, showed that agricultural research has helped to sequester carbon worth some $200 billion across agroforestry, range and other systems that favor accumulation of organic matter in the soil.

The Evenson study confirmed findings by the International Maize and Wheat Improvement Center (CIMMYT) on the influence of its wheat improvement program in developing countries. In terms of wheat varietal releases, more than 84 percent of the spring bread varieties and 96 percent of the spring durum varieties were significantly based on CIMMYT germplasm. In terms of area, 59 percent of the bread wheat area and 69 percent of the spring durum areas were planted to varieties that were based primarily on CIMMYT germplasm. Of all the wheat area in the developing countries, 62 percent was planted to CIMMYT-related varieties. In the U.S., CIMMYT germplasm provides improved production characteristics such as greater disease resistance, stress tolerance, more efficient use of inputs and higher yields, and is widely used in U.S. breeding programs.

Regarding maize, the CIMMYT survey for Latin America indicates that 75 percent of the varieties released by the private sector were based on CIMMYT germplasm. Maize production in West and Central Africa rose more than three-fold between 1981 and 1996 based on varieties developed by CIMMYT and a sister center in Africa, the International Institute for Tropical Agriculture (IITA) in Nigeria.

Rice is another pillar of global food security—more than 3 billion people depend on it as the largest component of their diet. Three IARCs conduct research on rice. The largest, the International Rice Research Institute (IRRI), has developed irrigated rice technologies which have made possible 2.5 percent per year increases in productivity each year since 1965. This "extra rice" feeds an additional 600 million people, staying neck and neck with the ever-growing demand. IRRI scientists are now focused on developing more efficient and productive plant types (aiming for a yield of 12 metric tons per hectare), improved plant and disease resistance, hybrid rice, and more sustainable production technologies. Hybrid varieties developed by IRRI are beginning to come into commercial production: over half a million acres were planted in India 1999, in China the area is far larger. The West Africa Rice Development Association (WARDA) has made important breakthroughs in developing a new cross between African and Asian rice varieties that has high potential for greater tolerance to environmental, disease and insect constraints. Studies on uptake and impact in 1999 are exciting, as farmers recognize the benefits of the new strains: higher yields, even under low-fertility, greater competitiveness with weeds (thus requiring less labor), and earlier harvests, providing income at a critical time of the year.

Both the CGIAR system and the U.S. university community have important and highly complementary strengths. USAID continues to encourage increased collaboration between the two to combine the cutting-edge research of U.S. universities with the program strengths and on the ground presence of the IARCs. In 1999, more than 50 collaborative relationships were supported through the CGIAR linkage funds, a “soft earmark” within USAID’s CGIAR funding to underwrite research collaboration by U.S. researchers. Some 75 U.S. universities participated—most of them land grant universities—in a range of activities spanning genomics and biotechnology, computational methods, natural resource management (e.g., remote sensing, geographical information systems (GISs)) and economics and policy.

Global Scientific Research: Biotechnology

University and industry partners under the Agricultural Biotechnology for Sustainable Productivity Project (ABSP) completed a fourth year of field testing of insect resistant potatoes in Egypt and are addressing regulatory and intellectual property issues to prepare plans for commercialization in that country. Similarly, virus resistant squash and melon lines underwent field testing by both public research institutions and private seed companies in several Asian and Middle Eastern countries. In Indonesia, an ABSP-trained researcher has formed the Indonesian Inventor Society, which in turn has helped Indonesians to develop and patent several biofertilizer and biofungicide technologies.

Knowledge Dissemination and Training

In FY 99, more than 3000 individuals from 27 countries received CRSP support for undergraduate and advanced degrees or practical training in a wide range of areas. Typical short course contents included program management and evaluation, computer applications, research methodology and a full spectrum of technical topics.

A major outreach forum for the CRSPs are the individual websites maintained by each individual CRSP. After being highlighted on the USAID home page, the CRSPs enjoyed a surge of visitors, with the average CRSP entertaining nearly 2,000 hits per month. Electronic publications, connection with programmatic and technical materials, and access to information on study sites and software are offered by all CRSPs.

With limited financial support from the Office of Foreign Disaster Assistance (OFDA), several CRSPs were able to introduce technical packages to returning refugee populations and other rural recipients otherwise at risk of environmental or economic distress. In these cases, the university researchers teamed with international relief organizations and the international research centers to refine and disseminate appropriate planting materials and information.

The Association Liaison Office (ALO) for University Cooperation in Development

USAID's Global Bureau, Center for Human Capacity Development worked through the ALO, which serves the nation's six major higher education associations, to carry out a competitive grants program with educational institutions in developing countries to help solve mutually agreed upon development problems. In FY 1999, the ALO successfully implemented 29 partnership grants valued at nearly $3.9 million. The grants were in amounts of either $50,000 (for community colleges and workforce skills development), $100,000 (for any higher education institution to support USAID strategic objectives), or over $1 million (El Salvador, teacher training in early childhood development). Over $4 million of additional resources were leveraged from private firms and the participating institutions.

Nine of the 1999 grants, totaling $894,000, are for agricultural partnerships. This amount is being matched by $1,353,298 from partner institutions.

Sustainable Food Systems and the Environment

Environmental issues are closely tied to sustainable development and adequate food systems. Adequate attention to, and maintenance of, the natural resource base ensures adequate environmental services such as clean water and aquifer recharge that keep us all healthy and productive. Production systems that foster carbon sequestration enhance air quality and may help mitigate anthropogenically-induced climate change. In addition to our support for applications of biotechnology in agriculture,

sound natural resource management and the use of rigorous environmental risk assessment methodologies, USAID continues to emphasize elements focusing on the environment/agriculture interface: water conservation, integrated pest management, soil fertility, and global climate change, among others.

USAID promotes programs that contribute both directly and indirectly to achieving resource conservation and agricultural sustainability by integrating several factors.

Water Quality, Agroforestry, and Soil Stabilization

Integrated programs such as agroforestry for dairying enhance and protect several environmental services, while increasing livelihoods and food systems. In Kenya, the International Center for Research on Agroforestry (ICRAF) has shown that 400,000 families could benefit by using specific fodder trees, helping to reduce erosion and runoff from dairy operations, thus protecting water quality while boosting incomes. The SANREM CRSP has helped the Philippines to develop an agroforestry tree seed association with objectives to provide a more diverse set of tree species to local farmers, increase the number and biomass of standing agroforests, and help to stabilize the landscape. Trees are also being planted as a water quality measure, establishing riparian zones and helping to reduce sedimentation and water pollution. One community brought E.coli levels in water down to safe levels in just 6 months.

Some of USAID's partners conduct extensive agroforestry programs associated with soil fertility enhancement, environmental stabilization and incomes from fruit, wood and fuel. ICRAF is introducing *Calliandra* as a leguminous forage tree in Kenya, where it reduces overgrazing and enhances soil fertility. Biomass is also being used through management packages that combine green manure with locally available rock phosphate. These types of intervention lead to increased levels of soil organic matter, as well as higher plant growth rates. Perhaps most encouraging is ICRAF's finding that some areas of East Africa are seeing an increasing number of trees as population increases—helping to slow environmental degradation.

Soil fertility is of paramount importance to sustainable resource management. Key components include nutrients and organic matter. Over 100,000 Bangladeshi farmers are now using International Fertilizer Development Center (IFDC) promoted technologies (supergranules), reducing runoff and decreasing greenhouse gas (GHG) generation.

The IPM CRSP is helping to solve pest problems using less chemical inputs. In Africa, bean farmers can double production using seed treatments to control bean fly, while in the Philippines and Bangladesh, this CRSP has shown how to increase yields while sharply reducing pesticide spraying of vegetables. Integrated pest management has important economic benefits as well; in 1999, Africa benefited by some $400 million in additional cassava production due to the International Institute for Tropical Agriculture's (IITA) mealybug biocontrol programs.

Carbon Sequestration and Greenhouse Gases

Production systems that enhance carbon sequestration and mitigate emissions of greenhouse gases are emerging as critical areas of research and action. Agricultural systems that incorporate more efficient soil management, more efficient fertilizer use, and agroforestry can contribute to the amount of carbon sequestered. Carbon credits are increasingly important and are currently being traded at the Chicago Board of Exchange.

At aggregate levels, even the indirect benefits of agricultural and natural resources research have been significant. Agricultural technologies have helped to reduce greenhouse gases by 17 billion tons over the last 25 years. A 1999 CGIAR study, sponsored by USAID, has estimated that between 200 and 400 million hectares, much of it fragile, was not needed for agriculture because of higher yields. The valuation of biodiversity in these areas has been estimated at over $200 million. If additional land savings resulting from forage and livestock productivity gains are taken into account, another 50 million hectares of land has been conserved. The climate change implications of the resulting conservation of these lands in their natural state are huge. The greenhouse gas equivalent of the conserved biomass is estimated at 17 billion tons, with a value approaching $100 billion. USAID is exploring means of tracking land use changes using a combination of remote sensing ("greenness") and ground-truthing by the Center for International Forestry Research (CIFOR), ICRAF, the International Water Management Institute (IWMI), the International Center for Living Aquatic Resources Management (ICLARM), the International Livestock Research Institute (ILRI), and the SANREM, Global Livestock and Soils CRSPs.

Soil carbon accumulation is also associated with the development and introduction of reduced tillage activities. Farmers in the Indo-Gangetic plain are rapidly expanding use of new "low till" seed drills that allow them to plant wheat directly after rice. Although there are many agronomic and production benefits to the new system, CIMMYT researchers are also tracking its impact on soil organic matter, suggesting that gains of up to 25% are possible with crop residue management. Fertilizer efficiency increases and fuel use drops by about 30% over conventional tillage practices. Many other USAID programs are working on improving soil fertility and increasing organic content of soils, providing crops with greater tolerance to droughts as helps to increase yields, as well as increasing carbon sequestration.

Food Security Safety Nets and Improved Nutrition

Malnutrition has emerged as the single most important factor underlying early childhood deaths, as it weakens children's immune systems and leaves them more vulnerable to a range of infections. The World Health Organization has estimated that malnutrition is associated with more than one-half of all child deaths in developing countries. Thus it is not surprising that nutrition is a major thrust in USAID's child survival programs. The role of food in achieving nutritional goals has not been emphasized, however, and deserves greater attention based on an impressive and growing body of research results. For example, children from food secure homes are far less likely to die from diarrhea and other infectious diseases than are children from food insecure homes. An integrated and sustainable approach to Child Survival depends on access to adequate levels of nutritious food available at affordable prices. Food based approaches to nutrition are increasingly important as the world seeks to feed the growing population which exceeded six billion on October 12, 1999.

USAID's agricultural programs make significant contributions to sustainable achievement of nutritional and Child Survival goals. In 1999, $2 million in Child Survival funding was provided to support new technologies for increasing the nutritional quality of food. The funds are being used for the following areas:

- "Golden rice" development as a means of adding critical beta carotene to diets where Vitamin A is lacking (IRRI, other public and private sector partners)
- High-carotene mustard oil, to help ensure that poor people in South Asia get adequate dietary Vitamin A (ABSP, Monsanto and Indian private sector partners)

- ? Livestock-based foods and their impact on child health and development in Africa (GL CRSP)
- ? Increased vegetable production and consumption in East Africa and South Asia

These activities provide a critical, food-based complement to USAID's other Child Survival interventions. The same is true for many other USAID sponsored research efforts that produce foods rich in critical nutrients, e.g., iron rich rice, vitamin A rich sweet potatoes, protein rich rice, beans, and corn. Diets including these foods help mothers give birth to healthy babies and provide children the essential energy, protein and micronutrients so necessary to children's development. These same improved technologies also provide at risk families with increased incomes, lifting them out of poverty and providing money for health care and education.

USAID's agricultural staff is working closely with nutritionists, food technologists and biotechnologists to identify new opportunities for food-based approaches to Child Survival. Many of the interventions being analyzed feature women's management of productive resources, leading to major impacts on household food security and children's health. USAID/Addis Ababa recently reported research results that showed that members of households adopting improved dairy technologies consume 17% more calories, 13% more protein and 24% more fat than non-adopters. Women use additional income to purchase 80% of household food and men spend a third more on food than in non-adopting households. Most strikingly, the incidence of child stunting, a key child survival indicator, was reduced by more than half, from 43% to 20%.

USAID's agricultural partners, U.S. universities, IARCs, national programs in developing countries, NGOs and the private sector, have responded enthusiastically to the challenge of increasing the nutritional impacts of USAID's work. In the area of research, biotechnology is pointing to new ways to alleviate micronutrient malnutrition and provide an adequate diet for all children. Information technology is leading to improved surveillance and data gathering tools that can be used to prevent crises before they occur. USAID's agricultural partners are ready to contribute improving nutrition and reducing child mortality, helping to make Child Survival goals a sustainable reality.

Information and Mapping

The Agency places high value on information gathering and analysis activities. In response to the Government Performance and Results Act (GPRA), the Agency, through G/EGAD/AFS, is expanding collaboration with its partners to develop and integrate processes to assess impacts of federally supported programs. The Agency, in partnership with the University of Florida and Texas A & M University supports the development of impact assessment and prediction models in the agricultural sector, and continued to support research to improve productivity of agricultural development and measure progress toward that goal.

In 1999, USAID continued support to the Famine Early Warning System (FEWS) and the Agronomy, Hydrology and Meteorology (AGHRYMET) information system in Africa. These programs have greatly assisted the decision making process of governments in dealing with early warnings of drought, natural disasters, and climate changes that impact food security.

Food Quality and Value Added Processing

The growth of the U.S. food industry depends on development of international business and the ability to operate within the food regulatory framework of other countries. Similarly, developing countries, in order to compete in the global food and agriculture marketplace, must improve their food quality and food control legislation and inspection systems. Providing U.S. foreign assistance to

improve food safety worldwide makes sense in light of the expansion of international trade in food and the heightened awareness of microbiological and chemical contamination of food products. With the U.S. food companies increasingly sourcing products and ingredients from developing countries; meeting international standards for quality and safety will become paramount for competitiveness in the international food trade. Good Manufacturing Practices, Good Agricultural Practices and process controls such as Hazard Analysis of Critical Control Points (HACCP) will continue to increase in importance.

To address these food quality and food safety challenges, USAID designed a new activity in 1999, "Partnerships for Food Industry Development" (PFID). PFID will be implemented by university led partnerships that contribute to the economic growth of client countries by mobilizing private and public sector expertise to add value, as well as meet safety and quality standards, in the production of food products for the domestic and international markets. Taking into consideration concerns raised by BIFAD, PFID will also ensure that

- Outcomes include benefits for small farmers and/or the poor
- Activities are in the mutual interest of USAID Missions, U.S. industries, and universities
- Attention is paid to providing public goods and services not provided by the private sector

SECTION II
ACTIVITIES AND RECOMMENDATIONS OF THE BIFAD

The Board for International Food and Agricultural Development (BIFAD) is responsible for the planning and implementation of activities under Title XII. It also makes recommendations for and undertakes monitoring of these activities. The current chair of the Board is Dr. g. Edward Schuh, Regents Professor and Director of the Freeman Center for International Economic Policy at the University of Minnesota. Four other members on the Board are drawn from the university community and one from the private sector. Important BIFAD recommendations in FY 99 included: USAID approval of SPARE, a subcommittee of BIFAD that would specifically review and issue recommendations for research activities and priorities; convening a high-level conference on the development of agriculture in Africa; promotion of sound uses of biotechnology; and the collaborative engagement of private U.S. agribusinesses, international research centers, and the university community in development efforts. During FY 1999, BIFAD also awarded its second annual Chair's Award for Scientific Excellence.

SCIENTIFIC EXCELLENCE

Beginning in 1998, BIFAD instituted an annual Chair's Award for Scientific Excellence to recognize an individual researcher or team of researchers for a significant achievement from within the U.S. university community. The award highlights the success of USAID and university collaboration. It also recognizes work toward sustainable increases in food security and economic growth without environmental degradation. The 1999 award went to Dr. Richard Frederiksen, Texas A&M University, for his research in sorghum and millet pathology.

The picture shows Dr. Frederiksen (second from left), recipient of the Award, with his wife Mrs. Phyllis Frederiksen. Others from L to R, the Honorable Kevin Brady, Congressman from Texas, Dr. Edwin Price from Texas A&M, and Dr. G. Edward Schuh, the BIFAD Chair.

Themes from BIFAD meetings held in 1999 included:

February	FY 99 Agency Budget and Its Implications for Agricultural Programs; Private and Public Partnerships and Lessons Learned.
June	Biotechnology, Intellectual Property Rights, and Biosafety; Partnerships for Food Industry Development (an Agency initiative for university-private sector partnerships in food science, quality control and related trade issues).
October	Implementing the U.S. Food Security Action Plan; The Modernization of Agriculture and Bolstering Economic Prosperity in Developing Countries; The Role of International Trade in Transferring New Production Technologies.

IMPORTANT BIFAD RECOMMENDATIONS

BIFAD recommendations over the course of the year, and their disposition, are described below:

SPARE: BIFAD recommended that the Administrator of USAID approve the charter to establish SPARE (Sustainable Partnerships for Agricultural Research and Education). SPARE is designed to help the Agency determine agriculture research priorities and set in place a system for measuring the performance of CRSP research as well as identify means by which to initiate new CRSPs. It would also enhance communication between the Agency and the university community and promote exchange of personnel between the Agency and universities. (Action: The USAID Administrator approved the SPARE charter on July 7, 2000.)

African Agricultural Conference: BIFAD recommended convening a conference on enhancing agriculture in Sub-Saharan Africa. This conference will have participation at the highest level among the countries in the region and from the U.S. government. (Action: A university/NGO consortium, with some USAID support, is planning to employ key African consultants to undertake desk studies and interview leaders of the African agriculture community. The results of this work will be reviewed in Africa by a high-level group of U.S. and African leaders and compiled into a report that will be reviewed at a major conference to take place in early CY 2001.)

The Opportunity of Biotechnology: BIFAD recommended that USAID continue and expand its leadership role in biotechnology, and that the Agency specifically strengthen its efforts to assist developing countries to build their capacity in biotechnology, thereby increasing the opportunities for positively affecting food security and agricultural development. (Action: USAID began a program on capacity building in both technical and policy aspects of biotechnology in 1991 and remains committed to this effort. By virtue of USAID's early start in this field and our unique strategy of linking research and policy as well as the public and private sectors, other donor programs have adopted aspects of USAID's model.)

PFID: BIFAD recommended that the Agency develop its Partnerships for Food Industry Development (PFID) activity to address the following priorities: 1) key partners in the developing countries; 2) ensuring outcomes including benefits for small farmers and/or the poor; 3) defining the mutual interest of the USAID Missions, industries, and universities; and 4) providing public goods and services not provided by the private sector, rather than to displacing services normally provided by the private sector. (Action: The BIFAD recommendations were incorporated in the PFID request for application (RFA).)

Fertilizer Sector: To further develop the fertilizer sector in Sub-Saharan Africa, BIFAD recommended that the Agency develop resources that strengthen private fertilizer distribution systems; encourage the World Bank to revitalize its transportation-lending program; and assist in accelerating the search for high yielding crop varieties that compliment fertilizers. (Action: The International Fertilizer Development Center (IFDC), which USAID funds, has incorporated these recommendations in its five-year plan.)

SECTION III
FUTURE PROGRAMS AND ACTIVITIES

PRIORITIES AND FUNDING PROSPECTS

Table 8: Projected USAID Agricultural Funding, FY 2000 & 2001*
($ 000)

Bureau	FY 2000	FY 2001
AFR	92,200	99,100
ANE	113,600	85,900
BHR	1,800	5,900
E&E	31,900	37,400
G	26,000	24,800
LAC	25,800	24,600
M	7,000	2,500
PPC	400	400
Total	**298,700**	**280,600**

*FY2001 figures represent estimates as of September 30, 2000. The final budget figures are not yet determined.

POLICY ENVIRONMENT

Biotechnology

There is increased interest within the U.S. government and among external constituencies in the potential for agricultural biotechnology to address issues of economic development, hunger, improved nutrition, and environmental conservation in developing countries. USAID has already contributed to several interagency initiatives including negotiation of the Cartagena Protocol on Biosafety, participating in a State Department-led public information campaign, serving on the State Department's Advisory Committee on International Economic Policy (ACIEP) Working Group on Biotechnology, as well as collaborating closely with the State Department's Bureau for Oceans and Environmental and Scientific Affairs (OES) and the U.S. Department of Agriculture on several initiatives. USAID will continue to work with companies, industry associations, the U.S. university community, and NGOs to explore and open up opportunities for the appropriate, informed use of this promising technology in developing countries and will continue to play an active role in the Administration's dialogue with the Hill on this issue.

G/EGAD/AFS, in collaboration with the Africa Bureau, has launched a new regional biotechnology initiative for Eastern and Central Africa. Working through the regional Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), USAID's Agricultural Biotechnology for Sustainable Productivity Project (ABSP) is providing technical support to development of a major new program on biotechnology and biosafety. This African-led initiative is seeking new regional mechanisms to building capacity and access to biotechnology as well as promoting regional cooperation and harmonization of biotechnology regulations. It is envisioned that after a one year planning phase, ASARECA will solicit multidonor support for implementation of the program.

Trade and Investment Liberalization

Agricultural trade and investment will continue to be critical issues for developing countries. G/EGAD/AFS will continue to put a priority on helping developing countries increase their agricultural exports (regionally/globally) and attract foreign investment. Human capacity remains a constraint to trade/investment policy development in less developed countries (LDC), and G/EGAD/AFS will expand its efforts to develop increased capacity. G/EGAD/AFS will work within the USG interagency process to promote greater USG policy coherence thereby increasing the effectiveness of development investments. Globalization is an emerging concern for developing countries that affects their openness to trade. They fear being overwhelmed by international economic forces rather than benefiting from expanded market opportunities. G/EGAD/AFS will help governments develop the technical and policy capacities to understand and plan for globalization and its impacts. In addition, G/EGAD/AFS will work to broker increased LDC involvement in international, agricultural, and commercial networks.

RESEARCH AND EDUCATION CAPACITY BUILDING

Strategic Partnership for Agricultural Research and Education (SPARE)

During 1999, the Agency moved to improve communications and broaden the basis for involvement of the U.S. university community in its activities through BIFAD. The Agency initiated action to more fully utilize the university community's capabilities in research and education through the development of a Strategic Partnership for Agricultural Research and Education (SPARE). On July 7, 2000, the Administrator of the Agency approved the Charter for SPARE. This Partnership will function as a sub-committee of BIFAD and the National Association of State Universities and Land Grant Colleges' (NASULGC) Board on Agriculture (BOA). It will report its findings and make recommendations to both BIFAD and the BOA. SPARE will consist of six members, three chosen from the universities and three chosen from the Agency. The Partnership will meet quarterly and is authorized to create such subordinate units as may be necessary for the performance of its duties and the discharge of its responsibilities.

The scope of the Partnership's activities include food security, agricultural modernization, rural development, natural resources, food systems, nutrition, agribusiness, agricultural trade, and intellectual property rights. The duties and functions of SPARE include: a) identifying emerging priority issues for Agency and university action, b) reviewing the performance of the on-going CRSPs and other Agency science and technology activities, c) making recommendations on funding levels based on past performance and priority objectives, and d) providing information to BIFAD and the BOA on the objectives and results of the university-USAID partnerships.

International Agricultural Research Centers (IARCs)

Following the System-wide review of the CGIAR, chaired by Maurice Strong of Canada, substantial attention was given to the two fundamental pillars of CGIAR research: Integrated Gene Management (IGM) and Integrated Natural Resource Management (INRM). Each of these areas figure prominently in the range of collaborative efforts that involve U.S. researchers (at universities, USDA/ARS, the private sector) and their counterparts in the international centers. Consultations that involved many U.S. scientists were undertaken in both areas. Important areas for expanded effort include functional and relational genomics in crop and livestock research and the use of remote sensing and geographic information systems to enhance broad scale applications of natural resource management research. Nutritional genomics are also under active review.

AFS made an important contribution to both research collaboration and enhanced application of new science tools at the IARCs. It sponsored six CGIAR centers in obtaining a "state-of-the-art" computational tool: geneflow. This tool allows breeders, gene bank managers and others to track genetic, phenotypic (traits) and pedigree information in a single overlay. This and similar tools are being used widely at U.S. universities and in private sector research. By having access to new tools, the IARCs are better able to engage in collaborative research with centers of excellence here and elsewhere. Important efforts are focussing on drought, heat and other stress tolerance, as well as a range of pest and disease resistance characters. IRRI is now leading an international partnership in rice genomics applications which focuses on many traits of interest to farmers around the world. Similar efforts in many other crops include the relevant international center, as well as CRSP and other U.S. university researchers.

SUSTAINABLE FOOD SYSTEMS AND THE ENVIRONMENT: SPECIALTY CROPS – COCOA AND COFFEE INITIATIVE

USAID has already begun to work in strategic partnership with the coffee and cocoa industries as means of achieving USAID's complementary goals of economic growth, particularly in small-holder agriculture, and environmental protection. Greater collaboration between USAID and the U.S. business community involved in coffee and cocoa will help small farmers and bring about important environmental benefits in over 30 countries where USAID is active and serve as a model for other efforts in sustainable development. For example, ACRI (American Cocoa Research Institute) and Mars Corporation have contributed research findings and made preferential purchases of cacao from USAID supported programs in several countries. Similarly, the Specialty Coffee Association of America (SCAA) member countries are involved in USAID country programs for small-holder agribusiness and have proposed a formal recognition of this growing partnership.

Memoranda of understanding (MOUs) will formalize these informal partnerships already underway at the country and regional program levels. These MOUs will provide a basis for further information sharing and co-ordination of activities, in particular, technical assistance to farmers, promotion of environmentally friendly production practices, and cooperation in the testing and possible implementation of a source certification system for coffee and cacao.

The benefits of expanding and formalizing this relationship are manifold. The U.S. is the largest consumer of coffee and the second-largest buyer of cocoa. U.S. buyers source coffee and cocoa beans from 40 or more countries. USAID is present in the majority of these countries and is working to increase the income of farmers through crop improvement, farmer organization, and better marketing. Some of these country programs have been directed at coffee and cacao.

The production of coffee and cacao (raw cocoa) involves some 30 million people in Latin America, Asia and Africa, the majority of them working on small farms of five hectares or less. With the right interventions, these farmers can improve production and have a more direct connection with buyers, enabling them to obtain a larger share of the world price.

U.S. business will benefit through improved access to small farmers. The international cocoa industry, including major U.S. companies, recognize that disease problems and low return to farmers are affecting the supply of cacao. A Sustainable Cocoa Program is being developed to address these threats. U.S. coffee roasters also recognize the need to secure a reliable supply of high quality coffee through technical assistance and a more direct connection with the farmers.

Very importantly, the environment also benefits. The countries where cacao and coffee are grown are very species rich. The traditional, small-holder coffee and cacao is grown under a diversified canopy of shade trees that represents the only forest-like cover left in many areas. If the prices received by small holders can be improved and maintained, these forest gardens, which are significant carbon sinks as well as valuable habitat and resources for the community, can be preserved and even expanded.

FOOD SECURITY SAFETY NETS: FOOD BASED NUTRITION PROGRAMS

G/EGAD/AFS launched a new initiative on "Food Based Approaches to Child Survival" in FY 1999, recognizing that food is a critical part of an integrated strategy to reduce malnutrition. Recent studies by the World Health Organization demonstrate that more than one half of child mortality in developing countries is linked to underlying malnutrition. Undernutrition and poor diet quality are both key factors. Working closely with the Center for Population, Health and Nutrition and its partners in the research community, G/EGAD/AFS has developed a set of initiatives focussed on the connection between food, diet quality and health. In its first stages, the initiative will focus on three program areas that will enhance the agricultural sector's capacity to supply children on a sustainable basis with nutrient-rich foods. Increased consumption of these foods should be economically feasible and reduce child mortality rates due to malnutrition. The three program areas are:

Biofortification of Staple Crops

Key opportunities to improve the nutrient content of foods using biotechnology have been identified; rice and mustard varieties have been developed that produce a seed enriched in beta-carotene (Vitamin A precursor) and iron. Deficiencies of these nutrients are widespread and associated with increased mortality, as well as blindness, anemia and other illness. Preliminary work (development of "golden rice") has already indicated that genetic modification is feasible scientifically, but many steps need to be completed to ensure that biofortified varieties will be acceptable to farmers, consumers, and the marketplace. The increased levels of beta-carotene, a precursor of vitamin A, should improve vitamin A status and consequently lead to reductions in child mortality.

Dietary Diversification: Animal-source Foods and Micronutrient-rich Vegetable Production and Consumption in Africa

The increased consumption of livestock products and micronutrient-rich vegetables are being implemented as a sustainable means to improve child health and development. Two G/EGAD/AFS partners, the Global Livestock CRSP and the Asian Vegetable Research and Development Center (AVRDC) are working in East Africa to promote consumption of high quality foods by children and mothers. Both efforts have important socioeconomic dimensions, elaborated by working through schools, women's groups, and NGOs. GL CRSP researchers will study the effect of animal source foods on pre-school age children whose families are part of school and women's groups linked community based efforts. AVRDC is expanding the availability of high-quality and nutritious vegetables to African NGOs and national agricultural research systems (NARS), and is evaluating and selecting local indigenous vegetables for increased promotion.

Agriculture-Nutrition Workshop

G/EGAD/AFS will co-sponsor a workshop on expanding the linkages between agriculture, health and nutrition. The workshop will be co-sponsored with the Food Consumption and Nutrition Program of the International Food Policy Research Institute (IFPRI) and will be held at the International Rice Research Institute (IRRI). Nutritionists and agricultural researchers from around the world will come together to explore opportunities for increasing the nutrition impacts of agricultural research and programs. Participants will examine opportunities for new technologies to increase the nutritional content of foods, but also more traditional areas highlighting the importance of gender in and maternal care in a range of program interventions.

GLOBAL INFORMATION SYSTEMS AND IMPACT ASSESSMENT

With the objective of agreeing upon and putting to use a suite of impact assessment models, the Agency will host a workshop for managers of the CRSPs, the CGIAR, and World Bank staff working on this subject. The ultimate goal is to have the Agency and our partners use these models in assessing impact and setting investment priorities in the agricultural sector. This process will sharpen results-oriented focus and identify impacts of programs, and will use international development specialists interested in the impact of, and advocacy for, agricultural research and technology transfer programs.

Investments in agricultural research are increasingly assessed in terms of their actual and potential impacts. Impact assessment informs effective program planning, priority setting, and management; strengthens program advocacy; and adds rigor to justifications for continued program funding. G/EGAD/AFS will continue to invest in a suite of impact assessment methodologies including *ex ante* and *ex post* simulation models and geographic information systems. Pilot applications of these methodologies will continue to be conducted on a range of activities, including the CRSPs and the IARCs, and over a range of geographic areas, including West and East Africa. The development of this toolkit will set the stage for a workshop on impact assessment planned for FY 2000, at which partners will discuss alternatives for data incorporation, storage, and management; inter-institutional cooperation; and institutionalization of impact assessment.

The farm practices that improve productivity generally also increase the efficiency of soils to remove carbon dioxide from the air and store carbon in soils. Carbon reserves in soils can be viewed as a commodity. Demand for sequestered carbon most likely will increase as the public learns more about climate change caused by greenhouse gases such as carbon dioxide. The Agency will expand its work to link agricultural carbon sequestration to combating poverty and promoting policy coherence among environmental and agricultural objectives. The Agency will spearhead an international approach to develop an inexpensive and easy methodology to measure and monitor carbon sequestration in agricultural lands. This methodology will be housed in an international agency to collect global information on carbon sequestration and climate change.

FOOD QUALITY AND VALUE ADDED PROCESSING

Partnership for Food Industry Development (PFID)

PFID is moving into the implementation phase. A total of $1 million (up to $500,000 for each award) has been authorized for obligation for FY 2000 for two cooperative agreements with university led

consortia. In addition, through Associate awards from other USAID Missions and Bureau offices, it is anticipated that an additional $2 million per year total may be available to the initial PFID partnerships.

Few areas of global trade and economic integration are currently as capable of generating as much sustainable foreign exchange earnings and employment for the world's emerging economies as the food products trade. Furthermore, few international trade issues are currently as controversial or important to U.S. exporters and vital to U.S. trade interests. The food industry is being transformed not only by the WTO Sanitary Phyto-Sanitary (SPS) Agreement, which requires a science-based approach to setting standards for food products trade, but also by new food packaging and processing needs and technologies.

PFID's approach is to assemble partnerships comprising universities, business associations and individual firms that will be recognized as "centers of excellence." In collaboration with USAID Missions, the partnerships will help client countries apply strategies to improve food quality and export earnings by:

- ? Promoting a science-based legal, regulatory and policy framework for international trade in food products through global trade regime enhancements as required under WTO Agreements
- ? Adapting and applying food processing technologies and marketing systems to create value added products or to improve their safety and quality for domestic and global markets

Through PFID, the complementary strengths of U.S. universities, industry associations, and individual agribusiness firms will be pooled for mutual benefit and for the benefit of their counterparts in USAID client countries.

Dairy Enterprise Initiative (DEI)

G/EGAD/AFS has initiated a new activity called the Dairy Enterprise Initiative (DEI) as an umbrella project to strengthen the dairy industry in developing and market transition countries, and serve as a vehicle for future Dairy Directive funds. DEI is a three year activity with an authorized life of program (LOP) funding of $30 million. It is designed to bring U.S. expertise, technology, and funding together to, *inter alia,* expand the ability of small dairy producers, processors and service providers to increase milk yields and produce higher quality and value added dairy products, to educate consumers, to increase cash incomes to small farmers, especially women who are the primary caretakers of dairy animals, and to assist U.S. dairy producers and companies prepare for more competitive international markets.

The increasing importance of dairy and livestock in development was highlighted in a recent IFPRI report, *Livestock to 2020: The Next Food Revolution*. According to this work, annual per capita demand for milk will increase by 48 kilograms or 132% within the next 20 years. However, per capita consumption of milk products in developing countries is expected to average only one-third that of developed countries. In addition,

- ? Sixty percent of the world's milk consumption will take place in the developing countries in 2020
- ? Increased consumption of even relatively small amounts of meat and milk supplies the critical micro-nutrients for healthy physical and cognitive development of children

? As fundamental and far-reaching changes emerge in the dairy sector, large scale entry of private capital will strengthen efficiency and productivity in processing and marketing

The more than $30 million invested by USAID Missions in the last five years as matching, direct companion or follow on grants to Dairy Directive pilot activities indicates the extent to which effective field demand for dairy industry partnerships exists. This Mission demand is likely to increase in the coming years as improving cold chain technologies and consumer demand for high quality protein rich food sources grows throughout the world's emerging economies. The dairy industry is therefore an important engine of broad based employment and income opportunity creation. Furthermore, expanding the availability and affordability of dairy products provides important nutritional benefits that accrue, particularly, to physical and cognitive growth of children and to lactating women. The Dairy Enterprise Initiative positions the Agency to move more effectively in this direction.

CONCLUSIONS AND RECOMMENDATIONS

FY 1999 was a year in which USAID, the U.S. university community and our IARC and NGO/PVO partners, made progress toward famine prevention and freedom from hunger. This report documents the mutual benefits that accrued to both developing countries and the U.S.

For progress against famine to continue and the battle over hunger to be won, the following topics will require attention and support in the years ahead:

? Renewed and expanded recognition of agriculture's importance in fighting poverty, increasing trade, and restoring the environment.

- ✍ Continued dialogue with USAID and the university community on agriculture
- ✍ Agency strategy on cutting hunger in half in Africa
- ✍ Keeping donor and world poverty goals to focus on agriculture

? Greater international focus of universities on agriculture, technical research, capacity building and technology diffusion in partnership with USDA, the IARCs, and NGOs, including new areas such as:

- ✍ Biotechnology
- ✍ The impact of HIV/AIDS on agricultural production and productivity
- ✍ Food-based nutritional improvement programs
- ✍ Human capacity development and strengthening

? Greater attention and support by agriculture to environment and safety concerns and opportunities.

- ✍ Water conservation and usage
- ✍ Carbon sequestration and the positive role of agriculture in countering global warming
- ✍ Soil degradation - restoration of fertility
- ✍ Food safety

? Increase the contribution of agriculture to globalization and trade-based prosperity in the U.S. and overseas.

- ✍ Greater U.S. university dialogue with USAID and other U.S. foreign affairs agencies on trade expansion
- ✍ Policy reforms and refinements
- ✍ Input/output market development
- ✍ Livestock revolution and its impact on markets

USAID and its development partners in the U.S. university community and the IARCs will continue to apply available staff and financial resources to address the above constraints. With the renewed commitment and support outlined above, meeting the *U.S. Food Security Action Plan* goal to reduce hunger by one half by 2015 is possible. Cooperation and a sustained commitment from the public, private, and NGO segments of our society will ensure that it happens.

ACRONYMS

ABSP	Agricultural Biotechnology for Sustainable Productivity Project
ACIEP	Advisory Committee on International Economic Policy
ACRI	American Cocoa Research Institute
ADRA	Adventist Development and Relief Agency
AFR	Africa
AFSI	Africa Food Security Initiative
AGERI	Agricultural Genetic Engineering Research Institute
AGHRYMET	Agronomy, Hydrology and Meteorology
ALO	Association Liaison Office
ANE	Asia and the Near East
APAP	Agricultural Policy Analysis Project
APD	Agricultural Policy Development Project
AMIS	Agribusiness and Marketing Improvement Strategies Project
ARS	Agriculture Research Service, USDA
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ATRIP	Africa Trade and Investment Initiative
AVRDC	Asian Vegetable Research and Development Center
BASIS	Broadening Access and Strengthening Input Marketing Systems CRSP
B/C	Bean/Cowpea CRSP
BHR	Bureau of Humanitarian Response
BIFAD	Board for International Food and Agricultural Development
BOA	Board of Agriculture, NASULGC
CASP	Postharvest Collaborative Agribusiness Support Program
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Center
CRSP	Collaborative Research Support Program
CSD-8	Commission on Sustainable Development, Eighth Session
CY	Calendar Year
DAC	Development Assistance Committee
DEI	Dairy Enterprise Initiative
DPRK	Democratic Peoples Republic of Korea
E&E	Europe and Eurasia
EXTENSA	Agricultural Extension for Food Security (Spanish Acronym used by CARE in Honduras)
FAO	Food and Agriculture Organization of the United Nations
FEWS	Famine Early Warning System
FTAA	Free Trade Area of the Americas
FY	Fiscal Year
G	Global
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
G/EGAD/AFS	Global Bureau/Center for Economic Growth and Agricultural Development/ Office of Agriculture and Food Security, USAID
GHG	Greenhouse Gases
GIS	Geographical Information System
GL	Global Livestock CRSP

GPRA	Government Performance and Results Act
HACCP	Hazard Analysis of Critical Control Points
IARC	International Agricultural Research Center
ICRAF	International Center for Research on Agroforestry
ICLARM	International Center for Living Aquatic Resources Management
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFDC	International Fertilizer Development Center
IGM	Integrated Gene Management
IITA	International Institute for Tropical Agriculture
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IMP	Integrated Pest Management
IMPACT	Impact Methods to Predict and Assess Contribution of Technology
INRM	Integrated Natural Resources Management
INTSORMIL	Sorghum/Millet CRSP
IPR	Intellectual Property Rights
IPM	Integrated Pest Management CRSP
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
JCARD	Joint Committee on Agricultural Research and Development
KARI	Kenyan Agricultural Research Institute
KIMS	Knowledge Information Systems
LAC	Latin America and the Caribbean
LEWS	Livestock Early Warning System
LDC	Less Developed Countries
LTC	Land Tenure Center, University of Wisconsin
LOL	Land O'Lakes
LUPE	Land Use and Productivity Enhancement Project
MAMA	Macedonian Agribusiness Marketing Activity
MIS	Market Information System
MOU	Memorandum of Understanding
NARS	National Agricultural Research Systems
NASULGC	National Association of State Universities and Land Grant Colleges
NGO	Non-Governmental Organization
NuMaSS	Nutrient Management Support System
OECD	Organization for Economic Cooperation and Development
OES	Bureau for Oceans and Environmental and Scientific Affairs, State Dept.
OFDA	Office of Foreign Disaster Assistance
PADF	Pan-American Development Foundation
PD/A	Pond Dynamics/Aquculture CRSP
PFID	Partnership for Food Industry Development
PPC	Policy and Program Coordination
PPMP	Pest and Pesticide Management Project
PRARI	Program to Revitalize Agriculture through Regional Investment
PRN	Poverty Reduction Network
PRSP	Poverty Reduction Strategy Paper
PVO	Private Voluntary Organization
RFA	Request for Application
SANREM	Sustainable Agriculture and Natural Resource Management CRSP
SCAA	Specialty Coffee Association of America
SECID	Southeast Consortium for International Development

SG	Sasakawa Global (2000)
Soils	Soil Management CRSP
SPARE	Strategic Partnership for Agricultural Research and Education
SPS	Sanitary Phyto-Sanitary
SXWW	Spring Time Winter Wheat Program
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
USDA	U.S. Department of Agriculture
USG	U.S. Government
WAICENT	Worldwide Agricultural Information Center, FAO
WARDA	West African Rice Development Association
WHO	World Health Organization
WTO	World Trade Organization